

**PROGRAM-FOR-RESULTS INFORMATION DOCUMENT (PID)
CONCEPT STAGE**

Report No.:PID0024658

Program Name	Hebei Pollution Prevention and Control Program
Region	East Asia and Pacific
Country	China
Sector	Other Industry (55%), General agriculture, fishing and forestry (15%), General Energy (15%), urban Transport (15%)
Lending Instrument	PforR
Program ID	P154672
Parent Program ID	Not applicable
Borrower(s)	People’s Republic of China
Implementing Agency	The Development and Reform Commission of Hebei Province
Date PID Prepared	September 1, 2015
Estimated Date of Appraisal Completion	March 14, 2016
Estimated Date of Board Approval	May 26, 2016
Concept Review Decision	Following the review of the concept, the decision was taken to proceed with the preparation of the operation.
Other Decision	N/A

I. Introduction and Context

A. Country Context

1. China faces some of the world’s most difficult environmental challenges due to its rapid development and resource intensive growth model. Air pollution is an increasingly complex problem – stemming from reliance on coal but increasingly from vehicular emissions, dust and secondary particulates (formed when ammonia from fertilizers and livestock waste, interacts with NO_x, SO_x from industrial and vehicular emissions). While air quality has improved in general over the past few years, levels remain high and economic costs from health impacts are rising, partly due to higher exposure levels in urban areas with higher population densities. The costs of environmental degradation and resource depletion are high, estimated to equal up to 10 percent of GDP, of which air pollution equals up to 6.5 percent.

2. The Government of China (GoC) has made great efforts to address environmental consequences of its growth model with its recent declaration of war on air pollution. The 11th five-year Plan (2006-2010) mandated that sulfur dioxide (SO₂) emissions be reduced 10 percent nationwide compared to 2005. This target was reinforced by additional standards set by the NDRC and MEP for emissions from heavy industry. The 12th five-year Plan (2011-2015) expanded the list of major air pollutants with binding emission reduction targets to include ammonia (NH₃) and nitrogen oxides (NO_x) (10 percent reductions compared to 2010). It also mandated a further reduction of SO₂ by 8 percent. As a result, China achieved a decline of

annual average PM10¹ concentrations in cities from about 145µg/m³ to about 80µg/m³ between 1997 and 2012.

3. To further improve air quality, over the past five years the GOC has been focusing on PM 2.5² which is the most critical pollutant for public health. In 2012, the GoC issued stricter standards for ambient PM2.5 concentration³ which will go in effect in 2016 and are comparable to Interim Targets defined by the World Health Organization (Table 1).

Table 1. Ambient PM 2.5 (µg/m3) concentration defined by China (GB3095-2012) and World Health Organization (WHO)

	Annual mean concentration PM2.5 (µg/m3)	24-hour concentrations PM2.5(µg/m3)
WHO Interim Target 1	35	75
GB3095-2012 Standard II	35	75
WHO Interim Target 2	25	50
WHO Interim Target 3	15	37.5
GB3095-2012 Standard I	15	35
WHO Air Quality Guideline (AQG)	10	25

4. Recent episodes of severe air pollution in the Beijing-Tianjin-Hebei region (hereafter referred as the JingJinJi region), from January 2013 onwards brought air quality into the center of environmental policy concerns. In first response in 2013, the State Council issued the Air Pollution Prevention and Control Action Plan⁴ (SCAP) with a set of ten air pollution prevention and control measures. The measures can be organized around three complementary principles: (i) promote of market mechanisms for enterprise to decrease emissions and increase efficiency, (ii) increase the coverage and effectiveness of enforcement, and (iii) improve planning and regional coordination.

5. The specific indicators of the SCAP are: By 2017, the urban ambient concentration of PM 2.5 nationwide shall decrease by 10 percent compared with 2012; annual number of days with fairly good air quality will gradually increase. Concentration of ambient PM2.5 in the country's three main urban and industrial regions -JingJinJi, Yangtze River Delta and Pearl River

¹ Particles smaller than 10 µm in diameter

² Particles smaller than 2.5 µm in diameter. Ambient PM 2.5 is a good indicator for air quality because it encompasses many pollutants. PM 2.5 is mainly by SO2, NOx, NH3, Cl, Volatile Organic Compounds (VOC), and black carbon (BC). These substances are emitted from combustion of fossils, use of fertilizers, livestock waste, industrial production from certain sectors (e.g. resins, iron/steel), fine dust from construction, biomass burning etc. Therefore, any program aimed at decreasing ambient PM 2.5 emissions has to be multi-sectorial.

³ GB3095-2012

⁴ GUOFA 37, September 10, 2013)

Delta- shall all decrease by 25 percent, 20 percent and 15 percent respectively compared to 2012.

6. In order to achieve the targets of the SCAP, JingJinJi region prepared a detailed regional Action Plan. In turn, each province/ municipality prepared its own further detailed Action Plan.

B. Multisectoral and Institutional Context of the Program

7. Air pollution in the JingJinJi region has reached critical levels. In 2012, Hebei had the highest annual average ambient PM 2.5 concentration in the region with $112.9 \mu\text{g}/\text{m}^3$, followed by Tianjin with $112.7 \mu\text{g}/\text{m}^3$, and Beijing with $88.3 \mu\text{g}/\text{m}^3$. Thus, the annual average ambient PM 2.5 concentration for the JingJinJi region was three times higher than the new Standard II of $35 \mu\text{g}/\text{m}^3$ set by the GoC.

8. Following the State Council's Action Plan, the Beijing- Tianjin-Hebei Pollution Prevention and Control Action Plan (JJAP) was issued in early 2014 with the aim to achieve the target of a 25 percent decrease in annual ambient PM2.5 concentration by 2017 compared to 2012.

9. Hebei is the largest contributor to ambient PM 2.5 concentrations in the JingJinJi region given that it represents 66 percent of area, has a concentration of highly polluting industries, vehicles and a strong agriculture sector. Hebei is the largest iron and steel producer in China, accounting for about one-quarter of national output. The power sector is almost entirely fueled by coal and nearly one-third of total installed capacity (15 out of 49 gigawatts) has been added in the past five years. Hebei is also an important cement producer, having 21 plants with a total production capacity of 58.3 Mt/year, which is nearly ten times the combined production capacity of Beijing and Tianjin of 6.3 Mt/year. In addition, the province accounts for 17 percent of national flat glass production.

10. Emissions from Industrial and Energy Sectors. In the 12th Five Year Plan, it was estimated that more than 85 percent of the industrial particulate matter (PM) emissions in the JingJinJi region were located in Hebei Province. From an emissions perspective, the Iron and Steel and the Power sectors are the dominant industrial air polluters in Hebei. These two sectors account for 52 percent of NO_x and 59 percent of SO_2 , both of which are responsible for regional ambient PM 2.5 concentration as well as acid rain. Nearly 90 percent of power capacity is made up of 100 facilities above 200 MW which have modern emissions control for SO_2 , NO_x , and particulates. Nonetheless, the remaining 10 percent of power capacity is composed of 293 smaller power plants (below 200 MW) which have less efficient pollution-control and likely account for a disproportionate share of air pollution. While the cement and flat glass industries account for lower shares of air pollution – 2.3 percent and 7.2 percent respectively of SO_2 and NO_x emissions in Hebei – their production can be a large share of local air pollution in concentrated areas. For example, the majority of flat glass manufacturers in Hebei are located in and around the populated city of Xingtai, and only a small fraction (10 percent) have any kind of furnace flue gas treatment such as desulfurization or particulate control devices.

11. Vehicular emissions. The massive industrial production also contribute to increasing transport-related emissions, primarily from road transport. In addition to its own industrial demand, Hebei also serves as the freight transport hub for northern China region, connecting

freight services to the ports on the eastern coast and to the southern provinces. According to 2014 data, Hebei had 1.4 million freight vehicles, which carried a highway freight volume of 1.85 billion tons and total vehicle mileage of 14.5 billion kilometers. Based on international experience, freight vehicles contribute to the major share of road transport emissions.

12. The old inefficient vehicles known as “yellow sticker vehicles”⁵ have been identified as another major source of vehicular emissions by the GoC. Yellow sticker vehicles represent about 10 percent of the national fleet but are estimated to account for 50 percent of the overall vehicular emissions. Hebei Province had about 15 million registered vehicles in 2014⁶ of which 1 million were yellow sticker vehicles. Official 2014 data for key Hebei municipalities, estimates that vehicular emissions contribute between 10 to 15 percent of the ambient PM_{2.5} in each municipality. Therefore, yellow sticker vehicles alone are responsible for between 3 to 4 percent of emissions.

13. Car ownership in Hebei has been increasing by an average of 19% per year as a result of the increase of income level in the province, and the population increase of 2 percent per year. Therefore, the continuous upgrade of the State Grade standards and the promotion of green vehicles are necessary to further decrease the average emissions per vehicle to offset the expected increase of the fleet over the next few years.

14. Emissions from rural areas. Hebei also is a large emitter of NH₃ (an important contributor to secondary PM 2.5 through its reactions with SO_x and NO_x) from agricultural activity, mainly owing to volatilization losses from excessive use of nitrogen (mostly urea) fertilizer and inadequate livestock waste treatment and disposal. For example, Hebei is one of the major producers of wheat in China. In 2013, there were 23,777 km² planted with wheat which represented 9.9 percent of the wheat-planted area in China and 11.4 percent of the national wheat production. The rate of N fertilizer application were 5.6 percent higher than the average rate in China which is already about 30 percent higher than the world average. Nitrogen was the most important fertilizer (301 kg/ha) representing more than 70 percent of all chemical fertilizers (434 kg/ha) applied in wheat fields, with 50 percent of it being urea-N. In Hebei, nitrogen use efficiency (NUE) in wheat, corn, and rice is less than 30 percent, which is significantly lower than the international NUE average of 51 percent. This low efficiency coupled with excessive fertilizer use has resulted in food safety and environmental problems, such as large N losses through NH₃ volatilization and nitrates leaching into ground water, rivers, and lakes. Studies in 2015 by Chinese and USA scientists that tracked the fate of fertilizer nitrogen, showed that between 20–50 percent of it leaked into air and groundwater — although the main pathway through which it was lost varied from crop to crop. For example, wheat and maize farmlands in the North China Plain lose 19 percent and 25 percent of applied nitrogen respectively, as a result of ammonia evaporation or volatilization.

⁵ According to the “Implementation Plan on Phasing Out Yellow Sticker and Old Vehicles” published by MEP in 2014, “yellow sticker vehicles” are gasoline vehicles that do not meet State Grade I standards and diesel vehicles that do not meet State Grade III. State Grade I for gasoline vehicles: CO emission does not exceed 3.16g/km, hydrocarbon emission does not exceed 1.13g/km; Stage Grade III for diesel vehicles: CO emission does not exceed 2.1g/km, hydrocarbon emission does not exceed 0.66g/km, particulate matters does not exceed 0.1g/km and NO_x does not exceed 5g/km.

⁶ 65 percent of the entire JingJinJi region fleet

15. Hebei is also the largest livestock producer in the JingJinJi region, responsible for 83 percent of the production of pigs, 86 percent of dairy, 68 percent of broiler farms and 93 percent of layer farms. This production generates an estimate of 308 million tons of ammonia in manure. Most of the production in Hebei come from medium size farms⁷ except for pigs which are mainly produced in large farms (over 10,000 heads). Practices of manure management in farms varies between the species: (i) the majority of pig farmers drying their manure for 7 days and then either selling or using the manure themselves, (ii) the majority of small dairy farms, layer farms and broiler farms collecting and selling wet manure, and (iii) the majority of large pig and poultry farms using anaerobic and aerobic ponds. More recently the larger farms are investing in technology such biogas plants to use the manure, with about 2,500 producing 14 million tons of manure/year for biogas.

16. Existing Hebei program. In order to tackle the challenge of reducing air pollution Hebei developed the multi-sectoral Hebei Pollution Prevention and Control Implementation Action Plan (HAP), which is organized under eight main sub-plans to:

- i. Increase the effort of comprehensive control of industrial enterprises and reduce emission of multi-pollutants. Specific activities include: control end-of-pipe emissions in key industries, emissions control of coal-fired boilers, and VOC control in petrochemical and organic chemical industrial sectors.
- ii. Enhance area pollution control and strictly control dust. Specific activities include: strengthening the non-point source pollution in rural areas (e.g. from fertilizer and the burning of crop residues and from inadequate animal manure management), substitute coal in household cooking and heating with biomass fuel bricks and briquetting); and clean burning stoves.
- iii. Enhance mobile source pollution prevention and control, and reduce the discharge of pollutants from vehicles. Specific activities include: improving fuel quality (gasoline and diesel with lower sulfur concentrations); eliminating old, high emission vehicles (known as yellow-sticker vehicles); promoting new energy vehicles; and, strengthening environment management of vehicles (e.g. taxis to replace the exhaust purification devices annually)
- iv. Accelerate the elimination of overcapacity and promote industrial transformation and upgrade. Specific activities include: reducing excessive capacity of high polluting industries and, controlling the expansion of high polluting industries (e.g., iron and steel industry, cement, electrolytic aluminum, flat glass, and ship-building)
- v. Adjust the energy structure and increase the clean energy supply. Specific activities include: implementing coal consumption cap; increasing the supply of natural gas, LPG, SNG, hydropower, and other clean fuels; increasing the use of clean coal (e.g. coal washing); and, developing green buildings.

⁷ According to Chinese regulation are considered medium size farms those with production ranging from 100 to 10,000 pigs, 50-500 dairy cows, 10,000 to 50,000 bird (broiler), and 2,000 to 50,00 birds (layer).

- vi. Strengthen environmental thresholds and optimize industrial layout. Specific activities include: enhancing the environmental impact assessment for the development layout, structure and scale of key industries according to the plans and requirements of main function regions within the province; and, enhancing the use of environmental protection and energy saving indicators, including the establishment of stricter emissions thresholds.
- vii. Accelerate the technology transformation, improve the innovation capability. Specific activities include: promoting studies on how to continuously improve and manage air quality in terms of fine particle matters (PM2.5) in the key cities in the province; implementing circular renovation of industrial zones and parks, waste- exchange utilization, land and water conservation and intensive but efficient farmland use via improved crop and input management practices, nutrient use efficiency improvements via reduced fertilizer inputs, increased recycling of residues and animal manures; and, promoting the development of emerging strategic industries, such as energy saving and environmental protection industries and new energy industries.
- viii. Establish monitoring and warning systems to cope with high pollution episodes. Specific activities include: strengthening the cooperation of the environmental protection departments with the meteorological departments to set up heavy pollution weather monitoring early warning, and high resolution weather-aerosol impact modeling systems; accelerating the revision of the Regulations on Environmental Protection in Hebei Province and Regulations on Air Pollution Prevention and Control in Hebei Province, with focus on total emission control, emission permit system, emergency and warning, and legal responsibility system; increasing the capacity on environment monitoring, information, emergency plan, supervision, research, publicity and instruction; and, actively carrying out various forms of communication and education to spread the scientific knowledge of the prevention and control of fine particle matters (PM2.5). Strengthen professional training on the air quality management.

17. Tsinghua University and the China Council for International Cooperation (CCICED) recently in 2014 studies to evaluate the capacity of the Beijing, Tianjin and Hebei Action Plans to reach their respective 2017 targets. The findings of the studies indicate that the full implementation of the action plans will deliver significant improvements of quality in the region by 2017, however there are risks in meeting the targets. For Hebei, the Tsinghua University study showed that at the current pace annual average ambient PM2.5 concentrations would decline from 112.9 $\mu\text{g}/\text{m}^3$ to 96.3 $\mu\text{g}/\text{m}^3$, a 14.7 percent decrease which is far below the 25 percent reduction target. The Tsinghua University study recommended additional measures for Hebei to achieve the 25 percent PM 2.5 concentration target, mainly in the areas to be considered by the PforR operation:

- Upgrade PM control technologies such as electrostatic (ESP) and fabric filter (FAB) in the steel industry;
- Install FAB in cement kilns and install selective non-catalytic reduction (SNCR) in cement plants;
- Upgrade the dust collectors in the coking industry;

- Install denitrification facilities in coal-fired heating plants;
- Equip heavy duty vehicles with Diesel Particulate Filters (DPF);
- Limit the use of Euro3 and below diesel vehicles that diesel consumption could be reduced by 20 percent of total consumption
- Increase the proportion of large scale livestock production to 30 percent to enable adoption of improved animal waste recycling, and promote the use of slow release fertilizers.

C. Relationship to CAS/CPS

18. The proposed operation is fully consistent with the Country Partnership Strategy (CPS) FY2013–2016 for China Strategy Theme 1: “Supporting Greener Growth”, in particular 1.6 “Demonstrating Pollution Management Measures”. The Operation also contributes to improve the implementation of the State Council’s Air Pollution Prevention and Control Action Plan. In addition, the operation also aligned with the WBG’s goal of promoting shared prosperity.

D. Rationale for Bank Engagement and Choice of Financing Instrument

19. The proposed operation is requested by the NDRC and the Ministry of Finance (MOF). The GoC considers this operation as an important means to improve the quality of the implementation of the Air Pollution Prevention and Control Action Plan in Beijing-Tianjin-Hebei, particularly in Hebei.

20. The HAP program is receiving considerable ear-marked resources (CNY 4 billion/year and CNY 800 million/year from central and provincial government respectively) but it may not achieve the target of 25 percent reduction of ambient PM 2.5 concentration by 2017. The referred reports released in 2014 by Tsinghua University and China Council of International Co-operation on Environment and Development (CCICED), which analyzed the implementation of detailed actions plans in Beijing, Tianjin and Hebei, concluded that at the current pace, Hebei would only achieve a reduction of 14.7 percent in ambient PM 2.5 concentrations by 2017.

21. Compared to investment lending, which focuses on capital formation and technology acquisition, the PforR is focused on outputs, in this case air pollution. Many investments in new infrastructure and dedicated pollution control equipment have been made in Hebei and other provinces in China over the past two decades, including with the support of the World Bank. Given the seriousness of air pollution in Hebei, it is critical that the objective be the reduction of air pollution, and the PforR is judged as the most appropriate lending instrument for this purpose at this time.

22. Specifically, the PforR will enable Hebei province and the World Bank to focus on increasing the effectiveness of the actions and measures included in the Hebei program (HAP), and the efficiency of its implementation as Hebei is not spending all resources ear-marked annually for HAP. The main challenges of this program are: (i) implementing additional measures or improving the effectiveness of the current practices needed to attain targets; (ii) strengthening of the government monitoring and enforcement actions to induce the companies to comply with the emissions standards; and (iii) strengthening of a more comprehensive air quality

planning and monitoring capacity to sustain the war on air pollution beyond the current five year plan.

23. The PforR offers a platform to share relevant international experiences in air quality management. The European Union's experience suggests that contrary to wide-spread belief, the dominant share of PM_{2.5} in Europe's cities originates from transboundary sources. Therefore, regionally coordinated local measures are an indispensable element for improvement. The EU also recognizes that in its case approaching WHO guideline values will require a focus also on ammonia emissions from large farms and PM emissions from wood/coal burning stoves for household use. This multi-sector approach resonates with Hebei's challenges. The United States Environmental Protection Agency's experience in quality assurance in measuring emissions from stationary sources, as far back as 1997, aligns with Hebei's challenges with determining stack emissions and equating these to the applicable emissions limit or standard. Both EU and USA examples provide ample knowledge on various elements of air quality management planning, such source and composition inventories and continuous environmental monitoring systems that when shared with Hebei counterparts can build the institutional capacity needed to sustain outcomes and improve programs. In addition, lessons learned from Bank operations in China on the use of slow-release fertilizers, generation of energy from biomass and the environmental management of livestock farms, can also contribute to improve Hebei's current and future Action Plan.

II. Program Development Objective(s)

24. To improve the implementation of the Hebei Pollution Prevention and Control Action Plan in key sectors to reduce emissions of SO_x, NO_x, NH₃ and Total Suspended Particulates (TSP).

III. Program Description

A. Description

25. **Program Description.** The proposed Bank-supported Program will support Hebei's entire Air Pollution Prevention and Control Action Plan except two of the eight main sub-plans (listed in paragraph 16). According to the environmental and social screening, the sub-plan to accelerate the elimination of overcapacity and promote industrial transformation and upgrade presents complex social, economic and environmental challenges is not well suited to be addressed through a PforR. The sub-plan to adjust the energy structure and increase the clean energy supply, given its scale and sector-specific issues, will be supported through another PforR for the entire JingJinJi region (P154669- Energy Efficiency and Green Energy Financing Program).

26. The Program will support the original geographic coverage (the entire province) and timeline (2017) of the HAP. During preparation, specific targets for actions to be supported by the Program may be defined or revised to ensure significant contribution to the overall goal of HAP to reduce PM_{2.5} concentration.

27. While supporting the entire HAP, within the PforR operation the selection of the

disbursement-linked indicators (DLIs) focuses on four areas that: (i) are directly addressing the underlying weaknesses among those identified by Tsinghua University and CCICED, (ii) the Bank has experience in China or international good practices are readily available, and (iii) can make significant contribution to the achievement of the 2017 target. As the Hebei provincial government has an overarching target of 25 percent reduction of ambient PM 2.5 concentration, the Bank's operation is to support the HAP through translating this overall target into sectoral emission reduction targets and enhanced implementation actions. Specifically, the proposed Program will focus on:

28. **Result Area 1: Reduce emissions of SO_x, NO_x and Total Suspended Particulates from key industrial sectors.** The goal is to ensure that industrial enterprises are meeting the Government's emissions standards on a daily basis, especially that investments in end-of-pipe and other emission-reduction solutions actually result in lower emissions. The program is currently based on reimbursing the heavy polluting companies (iron/steel, cement, glass and power plants) for between 30 to 50 percent of the cost of the desulfurization, denitrification, and dust removal equipment once their adequate installation is verified.

29. The program also provides CEM equipment to the provincial and municipal EPBs along with a protocol of data collection, transfer and storage. There are CEM installed in 667 locations in 237 industrial and power generating enterprises within Hebei. The program will further expand CEM into additional industrial and other point-source locations to ensure an even more extensive CEM coverage.

30. Meeting the currently strict emissions standards would result in reduced emissions as some enterprises have not yet installed required equipment or are not operating it properly. The type of measures to be supported by the Program would possibly include: (i) promoting the proper installation and operation of desulfurization facilities in, coal-fired power plants, sintering machines and pellet production equipment of iron-steel enterprises, and catalytic cracking units in oil refineries; (ii) promoting the proper installation and operation of denitrification facilities in coal-fired units and, in cement kilns; (iii) promoting the upgrade of dust removal facilities in coal-fired power plants, iron and steel enterprises, and cement work; (iv) upgrading the verification and data collection protocols based on similar protocols adopted in USA and Europe which have shown strong technical capacity in managing main polluters and bring air quality in line with WHO standards, and (iv) establishing a Smart Platform for Continuous Environmental Monitoring (CEM) covering all the main polluting enterprises of the entire province.

31. **Result Area 2: Reduce emissions from vehicular sources.** The goal is to ensure implementation of key measures for reducing vehicular emissions and fuel-related activities. The type of measures to be supported by the Program would likely include: (i) accelerating the elimination of yellow-sticker vehicles and disposing them properly; (ii) strengthening environmental management of vehicles to ensure compliance with government standards including piloting the adoption of catalyst and filter devices on heavy duty vehicles in selected areas ; (iii) promoting the use new energy vehicles specially on public transport, city services and government agencies; and (iv) implementing VOC controls to ensure oil and gas vapor recovery in the gas stations.

32. **Result Area 3: Reduce NH₃ and black carbon emissions from rural areas.** The goal is to optimize the use nitrogen-based fertilizers in crops, improve crop residue management, and improve waste management in animal husbandry farms. The type of measures to be supported by the Program would possibly include: (i) promoting the adoption by farmers of environment-friendly, slow-release formula fertilizers based on the results of soil testing and nutrient needs of crops during different growth periods; (ii) installing of Livestock Waste Management facilities in animal husbandry farms for energy co-generation, biogas and to produce organic fertilizer; and (iii) providing households with clean stoves and fuel brick residue made of compressed biomass residues.

33. **Result Area 4: Improve the Air Quality Monitoring and planning capacity of Hebei.** The goal is to develop modern air quality management systems and strengthen institutional capacity for the short- and medium-term planning and implementation of measures to continuously reduce ambient PM_{2.5} concentration in the province over the next 10-15 years. The program is currently based on the Ambient Air Quality Monitoring (AAQM) network established in 207 locations in Hebei province mainly for public information purposes. The program also collects information on rural emissions through satellite-based tool.

34. The type of measures to be supported by the Program would possibly include: (i) establishing a Smart Platform for Monitoring Ecological Environment covering the whole province, which integrates all environmental elements (AAQM, CEM rural emissions), with the meteorological departments to set up heavy pollution weather monitoring and early warning system, through an online information sharing system; (ii) strengthening the data collection system to have a more detailed and complete source and composition inventory of the source structure of both primary and secondary PM in order to guide future planning and interventions; and , (iii) developing a multi-year plan (possible 2018-2022) using modern AQM planning tools to ensure cost- effectiveness and prioritization.

35. Discussions about possible Disbursement Link Indicators (DLIs) have been held of part of the preliminary assessments and the initial dialogue with the Hebei partners. During the preparation of the PforR operation the team will complete the assessments (including targets and baselines), update the Result Chains and define a set of about eight DLIs which: (i) represent well the implementation of a number of complementary actions, and (ii) where the Bank Program contribute to increase effectiveness and/or efficiency. The indicative DLIs are highlighted in the each of preliminary Result Chain figures, and summarized on Table 2. Further analysis and consultation with the Hebei partner are necessary to define possible DLIs for the rural emissions which can be achieved within the lifetime of this operation.

Table 2 – Indicative Outcomes and DLIs under each Results Area

Result Area	Preliminary Outcomes	Possible DLIs
Result Area 1: Reduce emissions of SO_x, NO_x and TSP from key industrial sectors	<ul style="list-style-type: none"> - Reduction of SO_x emissions from Industrial sector - Reduction of NO_x emissions from Industrial sector - Reduction of TSP emissions from Industrial sector 	<ul style="list-style-type: none"> - One integrated CEM system upgraded - Increased Share of facilities meeting SO_x , NO_x and TSP emissions standards *

Result Area 2: Reduce emissions from vehicular sources	<ul style="list-style-type: none"> - Estimate Reduction of SO_x emissions of the fleet - Estimate Reduction of NO_x emissions of the fleet - Estimate Reduction of VOC emissions from gas stations 	<ul style="list-style-type: none"> - Yellow sticker vehicles eliminated from the streets and disposed adequately - Increase clean green vehicles compared to the total fleet *
Result Area 3: Reduce NH₃ and black carbon emissions from rural areas	<ul style="list-style-type: none"> - Reduction of NH₃ emissions from farming - Reduction NH₃ emissions from livestock - Reduction of Black carbon emissions from burning biomass 	<ul style="list-style-type: none"> - TBD
Result Area 4: Improve the Air Quality Monitoring and Planning capacity of Hebei	<ul style="list-style-type: none"> - Estimated reduction of ambient PM_{2.5} in Hebei after 5 years 	<ul style="list-style-type: none"> - Source and composition inventory for the Hebei province completed - - A cost effective 5 year plan to further reduce PM_{2.5} emissions in Hebei approved/ issued *

Note: * the percentage will be determined based on an in-depth assessment during the operation preparation.

36. *Institutional Arrangement for Implementation:* The proposed PforR operation will rely on existing structures and mechanisms used for implementing and monitoring the current Hebei Pollution Prevention and Control Plan. Given the cross-disciplinary nature of the air quality management, the institutional coverage includes almost all the agencies within the provincial government's structure⁸. It is also noted that the implementation takes place at the city or county level, so the institutional arrangement is a matrix that (in addition to the horizontal coordination) also involves a vertical structure that each line agency is mirrored at the municipal level and down to the county level.

37. Addressing the coordination complexity, the overall coordination is carried out by the High-level Provincial Working Group comprised of the governor (the Working Group Leader), the vice governors responsible for sectors covered in the plan (Deputy Leaders), leaders of relevant departments and municipalities. The Working Group's Office (WGO) has been established within the Hebei Provincial Environmental Protection Bureau (HEPB) serving as the secretariat to the Working Group for day-to-day management and coordination of the HAP. An annual work plan is developed by the EPB WGO which also works jointly with the Finance Bureau in allocating the annual HAP budget. Each activity defined in the annual work plan is assigned to a specific line agency which should lead its implementation. To address the additional coordination and support required by the PforR operation, the Development and Reform Commission of Hebei (Hebei DRC) has set up a coordination office to liaise with the respective line bureaus involved in the implementation of the HAP especially in the four Results Areas of the Program. Hebei DRC's multi-sectoral nature is expected to bring in additional valuable conveying channels to the program's coordination. The coordination office will coordinate directly and primarily with the EPB WGO and the Finance Bureau to ensure the EPB

⁸ The line agencies include the provincial Environmental Protection Bureau, Development and Reform Commission, Finance Bureau, Industry and Information Bureau, Transport Bureau, Agriculture Bureau, Public Security Bureau, Housing and Construction bureau, Land and Resources bureau, Commerce Administration and Quality Inspection Bureau etc.

WGO and the Finance Bureau are fully engaged in the PforR operation's design and implementation.

38. *Leveraging other Bank-Executed Trust Funds and Initiatives.* This PforR will benefit from the collaboration with the World Bank Pollution Management and Environmental Health Program (PMEH) established in November 2014. The objective of this Multi-Donor Trust Fund is to help client countries in reducing particularly air- but also land-based pollution and impacts on health through technical assistance to support improved air quality and land pollution management; knowledge generation and exchange to improve understanding of pollution and its health impacts; and promoting public awareness on pollution-health linkages by policy makers, planners, academia and other country- and international-level stakeholders. China has already been identified as one of the priority countries, and the work on air pollution will focus mainly in the JingJinJi region, with special attention on Air Quality Management (AQM) planning in Hebei.

IV. Initial Environmental and Social Screening

39. The Bank Task Team conducted an initial environmental and social screening of the program, in line with OP 9.0 Program-for-Results Financing as well as the Guidance Note to Staff: Environmental and Social System Assessment to: (i) identify potential risks that may be associated with the Program; (ii) to identify activities with complex social, economic and environmental challenges which are not well suited to be addressed through a PforR; (iii) to inform counterparts about environmental and social aspects involved in the PforR preparation and implementation phases; and (iv) to determine priority areas for further attention in the environmental and social system assessment.

40. Based on the information available, discussions with clients, and practices and experiences from the past, the major findings of the initial screening are as follows:

- Positive environmental and social benefits are expected as major results.
- The initial screening has identified activities which may bring about complex social and environmental issues, including closing down enterprises and boilers, and installation of new boilers. These activities are likely to have significant impacts that are sensitive on the environment and affected people are not well suited to be addressed through a PforR, and therefore have excluded from the Bank-supported PforR operation.
- Other risks related to activities supported by the Program mainly include (i) the Program includes the formulation or revision of a number of environmental laws, policies and regulations which may have downstream impacts; and (ii) the removal of yellow sticker vehicles may result in loses of assets or jobs for owners and drivers, and the r vehicles may not be disposed of in an environmental sound manner.

41. The environmental and social systems assessment (ESSA) will be conducted to identify the adequacy of the environment and social systems during preparation of the operation. Measures to address gaps or demand for improvements identified in the ESSA will defined in the Program Action Plan building upon the experiences from existing national and local policies and

regulations.

V. Tentative financing

Source:	Loan (\$m.)
Borrower/Recipient:	891
IBRD:	500
IDA	
Others (specify)	
Total	1,391

VI. Contact point

World Bank

Contact: Garo Batmanian

Title: Lead Environmental Specialist

Tel: 010-5861 7720

Email: gbatmanian@worldbank.org

Borrower/Client/Recipient

Contact: Yao Licheng

Title: Director, International Department, Ministry of Finance

Tel: 010-68552064

Email: yaolicheng@sina.com

Implementing Agencies

Contact: Qiao Xiaolin

Title: Director, the Development and Reform Commission of Hebei Province

Tel: 0311-8860051

Email: qiaoxiaolin@126.com

VII. For more information contact:

The InfoShop

The World Bank

1818 H Street, NW

Washington, D.C. 20433

Telephone: (202) 458-4500

Fax: (202) 522-1500

Web: <http://www.worldbank.org/infoshop>